SONY

Video Camera Recorder 8

CCD-SP9

Operating Instructions

Before operating the unit, please read this manual thoroughly and retain it for future reference.

This unit cannot be used under water.

Mode d'emploi

Avant la mise en service de l'appareil, lire entièrement ce mode d'emploi et le conserver pour toute référence ultérieure.

Cet appareil ne peut pas être utilisé sous l'eau.

Manual de instrucciones

Antes de utilizar la unidad, lea cuidadosamente este manual, y consérvelo para futuras referencias.

Esta unidad no puede emplearse bajo el agua.

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NATIONAL TECHNICAL DEPT.
FILE COPY
Do not remove

Video8 Handycam

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Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-SP9 Serial No. _____

WARNING

CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

THIS PRODUCT IS NOT MEANT TO BE IMMERSED IN WATER OR COME IN CONTINUOUS CONTACT WITH WATER.

Notice for the customers in Canada
This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

INFORMATION
This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the equipment with respect to the receiver
- Move the equipment away from the receiver
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

English

Please refer to the illustration corresponding to the letter code like [A-1] indicated in the instructions.

Notes

- The splash-proof CCD-SP9 has some resistance to water and moisture and makes it possible to use the unit outdoors. Exposure to water and moisture is not recommended.
- For "once-only" events, it is strongly recommended to have a trail run to check that everything is working perfectly.
- Television programs, films, video tapes and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws.
- PCM recording/playback is not possible with this unit. The PCM sound recorded or after-recorded with another recorder cannot be played back with this unit.
- For using the recorder abroad, see page 118.
- The following units are packed with the CCD-SP9 video camera recorder.
  - Battery pack NP-66H (1)
  - AC power adaptor AC-V35 (1)
  - RFU adaptor RFU-90UC (1)
  - AV connecting cord (1)
  - Shoulder strap (1)
  - Lithium battery CR2025 (1)

  For details on these units, please read their instruction manuals.

This unit uses 8 mm video format cassettes. It records in the SP mode (approximately 1.43 cm/second) and can play back in the SP mode and the LP mode (approximately 0.72 cm/second).
The quality of the playback picture in the LP mode, however, will not be as good as that in the SP mode.

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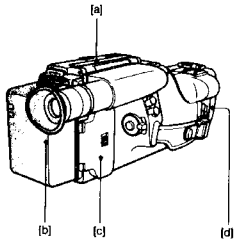
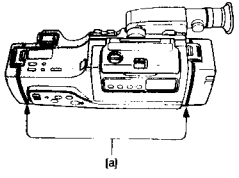
A-1



A-2



Notes on Use on the Sea or at the Beach

On Operation

- **Do not use the unit under water.**
- Avoid opening the top cover **[a]**, the battery cover **[b]**, the jack cover **[c]** or the lens cover **[d]** on the sea or at the beach. A-1 Operations such as installing and changing a cassette tape or the battery should be done in a place with low humidity and no sea breeze.
- The splash-proof integrity of the unit is maintained by the battery cover, the lens cover, the top cover, the jack cover and the rubber gasket. Be especially careful not to damage or deform those areas.
- If you cannot avoid leaving the unit in the sun, be sure to cover it with a towel or similar.
- Do not throw the unit into the water.
- Do not change a battery with a wet hand.
- Before opening the buckle or the cover, clean the unit with a dry soft cloth.
- Before recording, clean the lens cover.

On the rubber gasket A-2

- The rubber gaskets **[a]** assure the splash-proof function of this unit. To maintain splash-proof integrity, handle them properly. Incorrect operation may cause water leakage.
- Check that there are no scratches or cracks on the rubber gaskets. Scratches or cracks may cause water leakage.
- Remove foreign materials such as dust and sand completely from the rubber gaskets and the grooves and the surfaces of the body in contact with the rubber gasket.
- Useful life of the rubber gasket depends upon maintenance and the frequency of use, but we recommend changing them once a year at your Sony service facility.

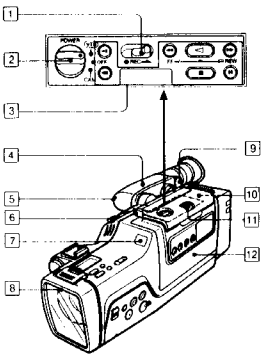
Notes on Use on the Sea or at the Beach

On Cleaning

After recording at a location subject to sea breezes, clean the unit with a soft cloth lightly moistened with mild detergent solution. If water drops remain on the unit, the metal parts may rust. Do not wash the unit under running water or use any type of solvent, such as alcohol or benzine for cleaning, as this might damage the finish.

Sony does not accept liability for damage to the video camera recorder, battery, etc. or for cost of recording if water leakage occurs as a result of incorrect operation.

B-1



Location and Function of parts and Controls

For details on the use of each control, refer to the pages indicated in the circle.

B-1

1 **● REC (recording) switch**
Slide in the direction of the arrow.

2 **POWER switch**
CAMERA: For camera recording
VTR: For playing back or editing tapes
OFF: Power off

3 **Tape transport buttons**
◁ (playback)
◀◀ FF (fast forward)
▶▶ REW (rewind)
■ (stop)
❚❚ (pause)
◀❚ (frame-by-frame)
◀ (slow)

4 **Viewfinder ●**
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.

5 **Camera recording/battery lamp**
Lights during camera recording. It blinks when the battery is weak or exhausted.

6 **Power zoom button ● ●**

7 **White balance sensor**
This is the sensor for auto white balance adjustment.
During recording, do not cover the sensor.

8 **Lens cover ●**

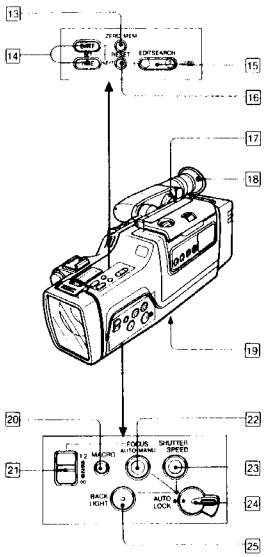
9 **Viewfinder lens adjustment knob ●**
Adjust to your eyesight to assure good focus. Be sure to adjust this knob when shooting for the first time.

10 **EJECT (cassette eject) button ●**
Located inside the top panel cover.

11 **Top cover OPEN button ●**

12 **Cassette holder**

B-2



[B-2]

13 **ZERO MEM (zero memory) button**
Used to memorize the counter zero point.

14 **DATE and TIME SET buttons**
Press to display or turn off the date or time.

15 **EDITSEARCH button**

16 **RESET button**
Press to reset the counter to zero.

17 **Viewfinder lock lever**
While pressing this lever, turn up the viewfinder.

18 **Eyecup**

19 **Tripod receptacle**
Note when attaching a tripod not manufactured by Sony
When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5mm. Otherwise the screw may damage the inner parts of the camera.

20 **MACRO set button**

21 **Focus adjustment button**

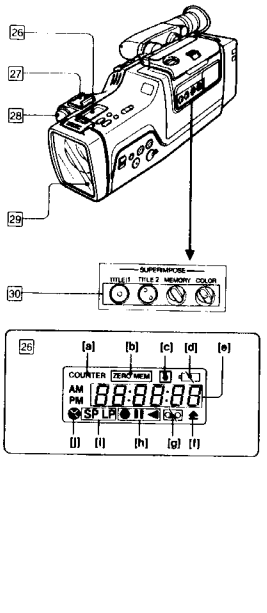
22 **FOCUS button**
Used for manual focusing.

23 **SHUTTER SPEED button**
Used to select the shutter speed.

24 **AUTO LOCK switch**
Normally set to the AUTO LOCK position for auto focusing, automatic iris adjustment and normal shutter speed. To adjust these items manually, set this switch to the upper position.

25 **BACK LIGHT button**

B-3



[B-3]

26 **Display window**
[a] COUNTER indicator
[b] ZERO MEM (memory) indicator
[c] Moisture condensation inside the unit.
[d] Blinks when the battery is weak.
[e] Indicates the time or the tape counter.
[f] Lights steadily during cassette ejection. Blinks when the unit cannot function normally.
[g] Lights steadily when no cassette is inserted. Blinks when the tape approaches its end or the safety tab of the inserted cassette is slid out (red).
[h] Tape operation mode indicators
[i] Tape speed indicator
[j] Blinks when the slit in the head is clogged.

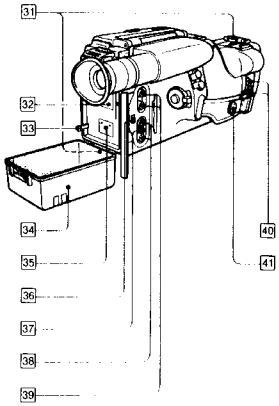
27 **Accessory shoe**
Attach an optional external microphone, video light, etc.

28 **Built-in microphone (monaural)**

29 **Infrared beam emitter and detector**
Transmits an infrared beam toward the object to be shot and receives the beam reflected from the object during auto focusing. Do not look into it for a long time when recording with auto focusing. Do not cover here.

30 **SUPERIMPOSE buttons**
Used to record the title.
TITLE 1 button
TITLE 2 button
MEMORY button
COLOR button

B-4



B-4

31 **Hooks for shoulder strap**
Attach a shoulder strap.
Be careful that the shoulder strap does not cover the white balance sensor, built-in microphone or lens.

32 **Lithium battery compartment** ●

33 **BATT (battery eject) knob** ●

34 **Battery cover** ●

35 **Battery mounting surface** ●

36 **EDIT switch** ●
Normally set it to the upper position. When editing tapes, set to EDIT.

37 **RFU DC OUT (RFU adaptor DC output) jack (special minijack)**
Supplies power to the RFU adaptor.

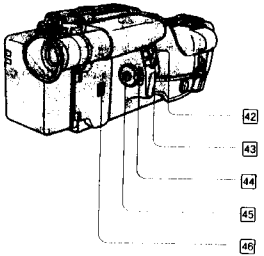
38 **VIDEO/AUDIO OUT (output) jacks (phono jacks)**

39 **VIDEO/AUDIO IN (input) jacks (phono jacks)**

40 **MIC jack and DC OUT (microphone power output) jack**
Connect an external microphone.
The MIC jack accepts Sony "plug-in-power" microphones and supplies power to them.

41 **Grip strap**

B-5



B-5

42 **(Earphone) jack (minijack)**

43 **REMOTE connector (stereo mini-minijack)**

44 **STANDBY switch**
Set to STANDBY to set the unit to recording pause mode.

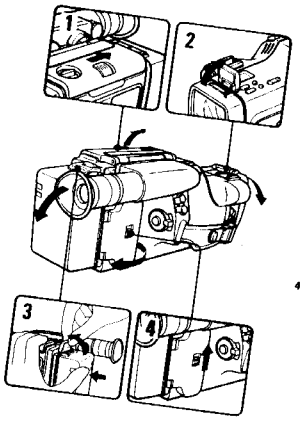
45 **START/STOP button**
Press to start and stop camera recording.

46 **LOCK/RELEASE button**
Slide to the RELEASE position to open the jack cover.

Note on jack caps
The MIC, DC OUT and (earphone) jacks and REMOTE connector are provided with jack caps. Be sure to put the caps on when they are not in use.

About
stands for Local Application Control Bus System. The connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

C



To Open Each Splash-Cover C

1 **Top cover**
- To insert or eject the cassette.

Slide the OPEN button on the top in the direction of the arrow.

2 **Lens cover**
- To clean the lens.
- To attach the filter or conversion l

Release the buckle.

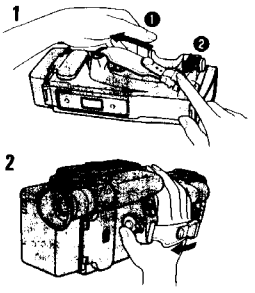
3 **Battery cover**
- To install or remove the battery pac
- To use the AC power adaptor

While pressing the upper part of the c release the buckle and turn the cover degrees down. The battery cover is removed. To attach the battery cover, h the bottom of the battery cover on the catches of the video camera recorder.

4 **Jack cover**
- To connect the equipment to be used with this unit.

Slide the LOCK/RELEASE button to the RELEASE position.

D



Adjusting the Grip Strap D

1 Loosen the grip strap.
- Pulling the strap,
- push to unfasten the stopper.

2 Pull to adjust the length of the strap so that your thumb can easily manipulate the START/STOP button.

Power Sources

Selection of Power Sources

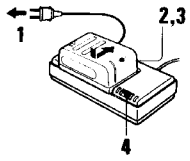
This manual shows the operations on one of the following power sources.

Place		Power source	Accessory to be used
Indoors		House current	AC power adaptor AC-V35 (supplied) or AC-V55 (page 30)
Outdoors		Battery pack	Battery pack NP-66H (supplied), NP-55, NP-77 or NP-77H (page 28)
In the car		12 or 24 V car battery	DC pack DCP-55 (page 30) (DCC-16B car battery cord supplied)

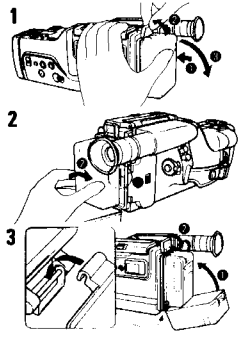
Notes on power source
- Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted cassette tape. If this is done by accident, supply the power again immediately and turn on the power switch.
- Be careful not to let any metal object touched on the metal part on the battery pack or AC power adaptor. When the battery pack is not be used, keep it in its case.
- The video camera recorder has not a splash-proof feature when it is used with an AC power adaptor or car battery cord.

Optional Accessories for Charging
- **AC-V55 AC power adaptor**
  Two battery packs can be charged simultaneously.
- **DC-V30 car battery charger**
  Connect to the cigarette lighter socket of a car to charge an NP-66H, NP-55, NP-77 or NP-77H battery pack, or to supply power to Sony 8 mm video equipment that operates only on the battery packs above mentioned.
- **BC-55, BC-77 battery charger**
  A battery pack can be charged.

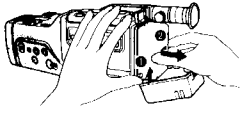
E-1



E-2



E-3



Using the Battery Pack

Step 1 **Charge the battery pack.** E-1

1 Connect the AC power adaptor to a wall outlet.
2 Align the grooves on the battery pack with those on the AC power adaptor.
3 Slide in the battery pack to the right, as illustrated.
4 Set the VTR CHARGE selector to CHARGE.

	NP-66H	NP-55	NP-77	NP-77H
Required charging time	100	60	120	140

(approx. minutes)

See the instruction manual of the AC power adaptor for details.

Step 2 **Mount the battery pack on the recorder.** E-2

1 While pressing the upper part of the battery cover, release the buckle, and open the battery cover.
2 Align the right side of the battery pack with the white line on the recorder and slide in the battery pack to the right.
3 Attach the battery cover.

Note
Make sure the battery fits completely on the mounting surface of the recorder. Imperfect fit may damage the projections on the recorder.

To remove the battery pack E-3

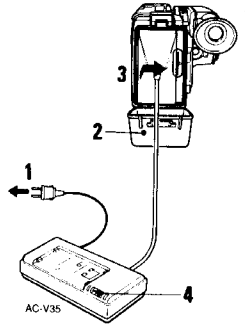
1 Open the battery cover.
2 While pressing the BATT knob in the arrow direction, slide and pull out the battery pack.
3 Attach the battery cover.

Battery life
A fully charged battery pack lasts for:

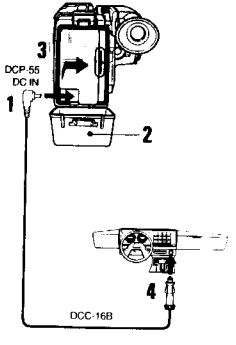
NP-66H	NP-55	NP-77	NP-77H
70	40	80	95

(approx. minutes)

E-5



E-6



Using the AC Power Adaptor E-5

1 Connect the AC power adaptor to a wall outlet.
2 Open and remove the battery cover.
3 Align the right side of the connecting plate with the line on the recorder, and while pressing the connecting plate, slide it to the right.
4 Set the VTR CHARGE selector of the AC power adaptor to VTR.

To remove the connecting plate for the AC power adaptor from the video camera recorder
While pressing the BATT knob upward on the recorder, slide and pull out the connecting plate.

Other options
The AC-V55 AC power adaptor can also be used to operate this recorder on house current.

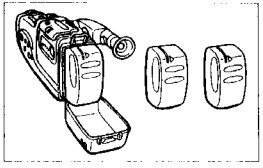
Using the Car Battery E-6

The DCP-55 DC pack (optional) is required.
1 Insert the DCC-16B car battery cord supplied with the DCP-55 DC pack into the DC IN jack on the DC pack.
2 Open and remove the battery cover.
3 Align the right side of the DC pack with the line on the recorder, and while pressing the DC pack, slide it to the right.
4 Connect the DCC-16B car battery cord to the cigarette lighter socket of a car (12 V or 24 V).

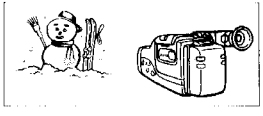
To remove the DC pack from the video camera recorder
While pressing the BATT knob on the recorder, slide and pull out the DC pack.

Other options
The AC-V55 AC power adaptor and the DCC-16AW car battery cord or the DC-V30 car battery charger can also be used to operate this recorder on a 12 V or 24 V car battery.

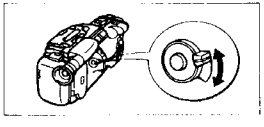
E-7



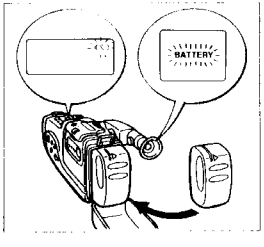
E-8



E-9



E-10



How to Care the Battery Pack

How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording than you have planned. E-7
"Battery life" as indicated in the instruction manual or catalogue of the recorder is measured by the continuous recording time of the recorder, placed at a room temperature using a full-charged battery.

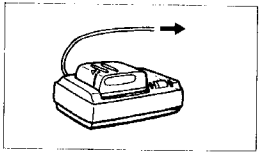
Battery life is shorter in a cold climated. E-8
Battery efficiency is decreased and the battery will be used up more quickly.

Turn the STANDBY switch of the recorder off when not recording to save battery power. E-9
A smooth recording can be made even if recording is stopped and started again. While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When the Rechargeable Battery Pack should be Replaced

When the battery becomes weak, the BATTERY indication and the red lamp in the viewfinder and the ⌧ mark in the display window blink rapidly. E-10
Turn off the power switch of the recorder and replace the battery pack. Leave the tape in the recorder in order to obtain a smooth recording after the battery pack is replaced.

E-12



Notes on Charging

Before using the battery pack, charge it sufficiently. A brand new battery pack is not charged.

Recharge the battery pack only when it is exhausted. E-12

- If recording is completed before the ⌧ mark appears in the display window, it is recommended that you remove the tape, set the POWER switch to CAMERA, slide up the STANDBY switch, and leave the recorder until the ⌧ mark blinks rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you fully charge and discharge the battery again.

Recharge the battery pack before using.
If the battery pack is charged fully but not used for a long time (about 1 year), it is discharged.
Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Keep the Terminals Clean

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also, wipe the + and − terminals with a soft cloth or paper.

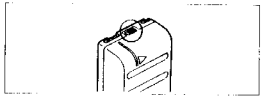
Notes on the Rechargeable Battery Pack

Why the battery pack heats up
During charging or recording, the battery pack heats up. This means that energy has been generated and chemical change has occurred inside the battery pack and this is not dangerous.

How to care for the battery pack
- Remove the battery pack from the recorder after using it, and keep it in a cool place. When the battery pack is in the recorder, a small amount of current flows to the recorder even if the POWER switch is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended that you charge the battery before using.

How to use the switch on the battery pack E-13

E-13

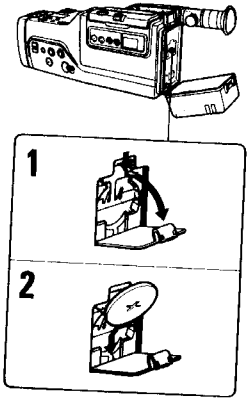


This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.

How many times can the battery pack be recharged
It can be fully charged and discharged about 500 times under normal temperatures.
If the ⟲ mark blinks rapidly just after turning on the recorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Temperatures during charging
Lower temperatures require a longer charging time. Charging under temperatures ranging from 10°C to 30°C (5°F to 85°F) is recommended.

F-1



F-2

Lithium Battery F-1

To Insert the Lithium Battery
This unit uses a lithium battery to activate the clock and to keep a title in memory. Before operating the unit for the first time, open the battery cover and install the supplied lithium battery:

1 Open the cover of the lithium battery compartment on the battery mounting surface.
2 Install the supplied CR2025 lithium battery with the ⊕ side facing out.
3 Close the cover.
4 Close the battery cover.

To remove the lithium battery F-2
Press the side of the battery in the direction as indicated for installation.

Lithium battery life
Approximately 1 year in normal operation. When the lithium battery becomes weak, the time indication will blink on the viewfinder screen for about 7 seconds. In this case, replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of another battery may present a risk of fire or explosion.

Notes on lithium battery
- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- Do not break up the battery nor throw it into a fire, which might cause it to explode. Carefully dispose of the used batteries.

WARNING
Battery may explode if mistreated.
Do not recharge, disassembly or dispose of it in fire.

Cassette Care

Cassette Insertion G-1

1 Open the battery cover and connect a power source.
2 Set the POWER switch to CAMERA.
3 Open the top cover fully.
4 Open the cassette holder cover, and slide the cassette eject button to open the cassette holder.
5 Insert a cassette with the window facing outside.
6 Push the cassette holder slightly to close.
7 Close the cassette holder cover and the top cover.

Cassette Ejection

1 Make sure that a power source is connected.
2 Set the POWER switch to CAMERA.
3 Open the top cover fully.
4 Open the cassette holder cover, and slide the cassette eject button to open the cassette holder.
5 Take out the cassette and close the cassette holder, cassette holder cover and the top cover.

To Prevent Accidental Erasure C-2

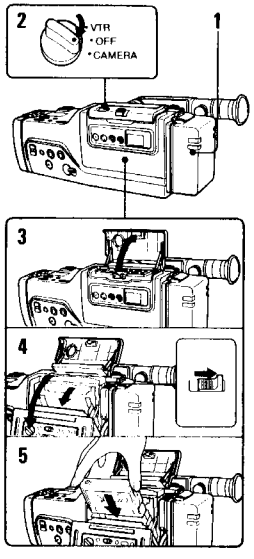
Slide out the tab on the cassette so that it covers the opening. (A red mark will appear.)

To re-record on the cassette, slide the tab in to uncover the opening.

Notes

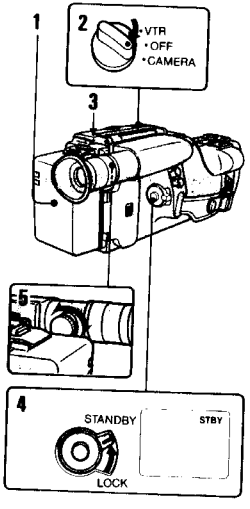
- Do not press the upper lid of the cassette compartment forcibly when it is moving.
- When the cassette holder is pressed to close, the upper lid of the cassette compartment will automatically lower.
- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the kind of tape, thickness of tape, or if the tab is out or in, etc.
- To record from the beginning of the tape, run the video camera recorder for about 15 seconds at the beginning of a cassette before recording. It will avoid missing the starting point during playback on a video cassette recorder.

G-1



C-2

H



Camera Operation

Adjustment of the Position of the Viewfinder Lens

The position of the viewfinder lens for optimum vision varies dependig on the person. H

1 Open the battery cover and connect a power source.
2 Set the POWER switch to CAMERA.
3 Insert a cassette.
4 Set the STANDBY switch to STANDBY.
5 Turn the viewfinder lens adjustment ring so that the indicator displayed on the viewfinder screen comes into sharp focus.

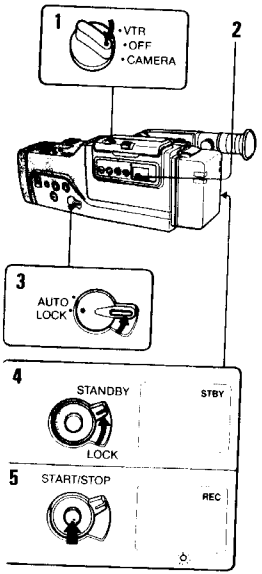
Adjustment of the position of the viewfinder lens is necessary only for your initial use, or for use after someone else.

Note

If you leave the unit in the recording pause mode for 5 minutes or more, the unit will be automatically turned off. To resume recording pause mode, slide the STANDBY switch down once and slide it up again.

1-1

1-2



Easy Camera Recording with Automatic Adjustment

How to Record

Hold the camera recorder as in the illustration.
If your nose touches the recorder, adjust the angle of the viewfinder. 1-1

1-2

1 Set the POWER switch to CAMERA.
2 Insert the cassette.
3 Set the AUTO LOCK switch to AUTO LOCK.
4 Set the STANDBY switch to STANDBY. The unit will enter the recording pause mode.
5 Press the START/STOP button. Recording will start.

Check on the viewfinder screen
STBY:Displayed during recording pause mode.
REC:Displayed during recording.

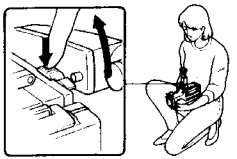
To stop recording
Press the START/STOP button again.
The unit will enter the recording pause mode. Avoid rough handling or mechanical shock to the unit. A smooth transition between scenes may not be made.

To check the last portion of the previous recording
1 Set the recorder in recording pause mode by pressing the START/STOP button.
2 Press the "–" side of the EDITSEARCH button momentarily.
The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unit then enters the recording pause mode.

If the picture has not been recorded
The video head may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette.

After using
• Set the STANDBY switch to LOCK.
• Set the POWER switch to OFF.

4



Easy Camera Recording with Automatic Adjustment

1-4

For low angle recording
While pressing the viewfinder lock lever, turn up the viewfinder. The viewfinder can be turned 90 degrees up.

When attaching the filter or conversion lens,
hold the focus ring.

During recording, if the unit is splashed with water
Before opening the battery cover or the top cover, clean the unit with a dry soft cloth.

Note on power source
If the POWER switch is moved during recording, the tape will stop.

Notes on light sources
• Should you shoot a subject in bright conditions such as sunlight just after shooting in a dark place, the picture may not appear on the viewfinder screen. In this case, move the camera away from the subject to resume the normal condition.
• A vertical band may appear when a subject such as a candle flame or a light is shot against a dark background.

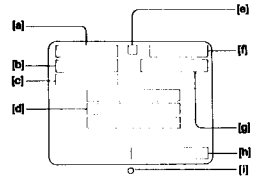
Notes on playback on another VCR
• To view the picture which has been recorded on this unit, set the monitor switch of the recorder for playback to the STD (standard) position.
• When recording on this unit using a tape on which PCM stereo sound has previously been recorded, set the monitor switch of the video cassette recorder for playback to the STD (standard) position. Otherwise, the sound may not be heard or may be distorted.

Easy Camera Recording with Automatic Adjustment

Notes on automatic adjustment
• During recording, do not cover the white balance sensor.
• During recording with auto focusing, do not turn or stop the focus ring forcibly.
• Keep the lens and the white balance sensor clean.
• The shutter speed is fixed at normal and the back light adjustment is released.

Under certain conditions, auto focusing will not operate properly (see page 60).

I-5



I-6

Indication inside the Viewfinder and in the Display Window I-5 I-6

[a] Title color (see page 80.)
[b] BACK LIGHT
The BACK LIGHT button has been pressed (see page 64.)
[c] Shutter speed (see page 66.)
[d] BATTERY: Weak battery.
CAUTION: The slit in the head is clogged.
DEW: Moisture condensation inside the unit (see page 112.)
CASSETTE: No cassette has been inserted or the safety tab of the inserted cassette is slid out.
TAPE END: The tape is at its end.
[e] White mark
The FOCUS switch has been set to the manual condition.
[f] STBY
Recording is momentarily stopped (recording pause mode).
REC
Recording is going on.
[g] ZERO MEM
The ZERO MEM button has been pressed.
[h] Date or time (see page 74.)
[i] Camera recording/battery lamp
Lights during camera recording. It blinks when the battery is weak or exhausted.

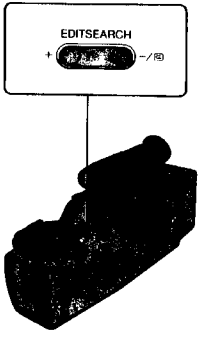
Indicators for caution

Display window I-6	Inside the viewfinder I-5
	BATTERY
or	TAPE END
	CASSETTE
	DEW
	CAUTION

Indicators for the setting of the switch

Display window I-6	Inside the viewfinder I-5
	BACK LIGHT
ZERO MEM	ZERO MEM
	■(manual focus)

I-7



Instant Playback on the Spot I-7

You can monitor the picture just recorded on the viewfinder screen.
1 Set the POWER switch to CAMERA.
2 Set the STANDBY switch to STANDBY.
3 Keep pressing the " – " side of the EDITSEARCH button to view the playback picture in reverse.
4 Keep pressing the " + " side of the EDITSEARCH button to view the playback picture.

During Recording, to Record Again on the Previous Recorded Portion

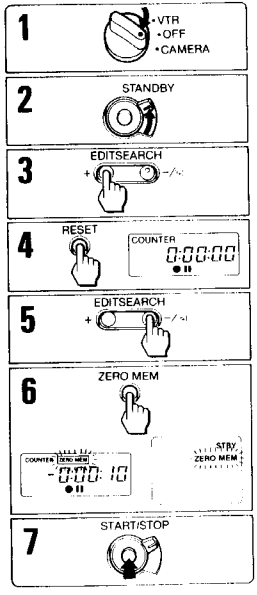
1 Set the STANDBY switch to STANDBY.
2 Locate the point from which the recording is to begin again by monitoring the picture on the viewfinder screen.
- Keep pressing the " + " side of the EDITSEARCH button to advance the picture at a normal playback speed, or the " – " side to reverse the picture.
- At the desired point, release the EDITSEARCH button.
The unit will be set to recording pause mode.

3 Press the START/STOP button to start recording.

Smooth recording can be made even if the recording is stopped and started again, or even if the power is turned off and on again, provided that the cassette is not removed. But, if the cassette has been removed, proceed as above.

J-1

J-2



Insert Recording 1
— Using EDITSEARCH button

You can insert (record) video and audio simultaneously from the camera onto any recorded tape. [J-1]

Operation J-2

Monitor the picture being inserted on the viewfinder screen.

1 Set the POWER switch to CAMERA.
2 Set the STANDBY switch to STANDBY.
The unit is set to recording pause mode.
3 Keep pressing the "+" or "–" side of the EDITSEARCH button and release the button at the point where the insert should end.
The unit will be set to recording pause mode.
4 Display the counter in the display window and press the RESET button.
The counter is reset to zero.
(For an accurate ending point, press the RESET button immediately after the EDITSEARCH button is released and while the still picture is displayed.)
5 Keep pressing the "–" side of the EDITSEARCH button and release the button at the point where the insert should begin.
6 Press the ZERO MEM button.
The insert ending point is stored in memory.
7 Press the START/STOP button.
Insert recording will begin.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press the ZERO MEM button so that the ZERO MEM indicator disappears.

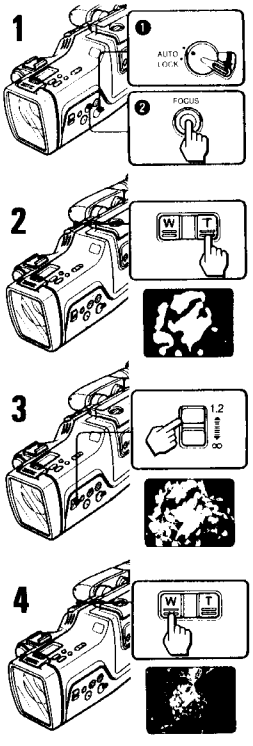
To insert the date or time
Follow steps 1 through 6 above, press the DATE or TIME button to display the date or time indication on the viewfinder screen and then press the START/STOP button.

Notes on ZERO MEM mode
ZERO MEM mode is cancelled automatically in the following cases.
- When an insert recording is completed.
- When the position of the POWER switch is changed.
- When the power is turned off.
- When the cassette is ejected.

To restore it, press the ZERO MEM button again.

Notes
- When recording pause mode lasts for approximately 5 minutes, pause mode will be automatically released and the unit will be set to stop mode.
- When the inserted tape is played back, the picture may be distorted at the end of the inserted program.

K-1



Manual Focusing

Use manual focusing when shooting subjects difficult to focus automatically (listed on page 60).

[K-1]

1 Set the AUTO LOCK switch to the upper position and press the FOCUS button.
2 Press the "T" side of the power zoom button to make the subject as large as possible in the viewfinder.
3 Press the upper or lower side of the focus adjustment button to achieve sharp focus.
Upper side: to move the lens forward
Lower side: to move the lens backward
4 Set the desired shot length using the power zoom button.

To reset to auto focus mode
Press the FOCUS button again.

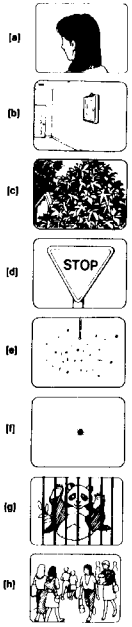
Some helpful hints
- When shooting in low light situations such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles, after focusing in telephoto.
- Recommended illumination of this unit is more than 100 lux (9.3 footcandles). If shooting is done indoors or under other circumstances where light is insufficient, video lights must be used for best results. Under adequate light condition, the depth of field in proper focus is wider and a sharper picture will be recorded.
- When the lens cover is attached, focus should be adjusted to the distance between the lens cover and the subject.

[K-2]

Manual Focusing

Poor Conditions for Auto Focusing [K-2]

To shoot subjects listed below you must use manual focusing.



[a] Black objects which absorb the infrared beam
Ex. dark curtains or shade

[b] Objects in which the infrared reflection disperses
Ex. a smooth slanting surface (Auto focusing functions when the camera is aimed squarely at the subject.)

[c] Objects in which the infrared reflection is not sufficient
Ex. bushes, grass or plants in the telephoto position

[d] Objects in which the infrared beam is reflected too much
Ex. traffic signs, a white wall, a mirror, or a subject through plate glass

[e] Objects not solid
Ex. fireworks, candle flame or smoke

[f] Exteremely tiny objects which do not cover more than 1/10 of the viewfinder's area
Ex. insects

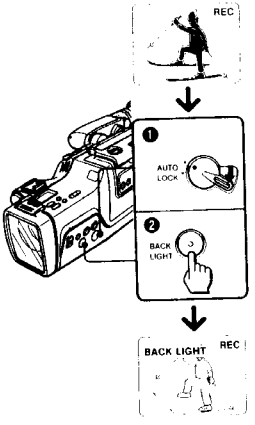
[g] When there are other objects between the shooting object
Ex. an animal inside a cage or baby inside a cot

[h] Moving objects
Ex. a crowd or sports with lots of movement

- **Objects which emit infrared beams themselves,**
  such as automatic doors or fluorescent lights.
- **Objects 10 – 60 meters (33 – 200 feet) away from the recorder**

[L]

Back Light Adjustment [L]



This unit adjusts the iris automatically. However, when shooting a subject that is backlit, set the AUTO LOCK switch to the upper position and press the BACK LIGHT button. The BACK LIGHT indication appears when the BACK LIGHT button has been pressed.

After shooting that particular scene, be sure to press the BACK LIGHT button again to release it. Otherwise the recorded picture will be too bright. The BACK LIGHT indication goes out.

Note
The function will be released once the POWER switch is set to OFF.

Automatic White Balance Function

The automatic white balance function allows the unit to record an image with natural color tones in most kinds of light.
This insures that white will always recorded as white regardless of the light source.

Notes
- The auto white balance may not function under the following conditions.
  — Insufficient light
  — When lighting conditions change rapidly
  — When the camera is in a different light condition from the recorded subject.
  ex. when the subject is under a spotlight
  when the subject is outdoors and the camera is indoors.
  — Special light sources such as a natrium lamp
- Do not cover the white balance sensor.

Other Uses of Manual Focusing

- When using special effects lenses or filters
- When shooting still subjects on a tripod
- For focusing in close-up shooting, see page 72.

Auto focusing system of this camera recorder
This recorder adjusts focus automatically by emitting an infrared beam at the objects to be shot and then detecting the reflected beam. When the subject is approximately 3 meters (10 feet) away from the camera recorder, the focus is sharpest in the center of the screen. The camera recorder has the tendency, however, to focus a bit lower to the right when the subject is within 3 meters, and a bit higher to the left when the subject is more than 3 meters away.

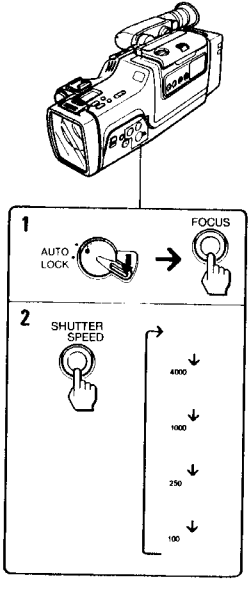
Notes
As the auto focusing of this camera recorder utilizes an infrared beam, it might malfunction when you use the camera recorder near another equipment that also emits an infrared beam such as a TV or VCR remote commander, or another camera recorder that uses an infrared beam for auto focusing.
It might also cause malfunctioning of such equipment.

Shutter Speed Adjustment

M-1

M-2

M-3



When a fast-moving subject is recorded at a normal shutter speed, its still picture may not be seen when played back [M-1]. This can be improved by increasing the shutter speed [M-2]. However, when the shutter moves fast, it will not allow enough light to come into the lens, so the picture will be dark. Therefore, when recording at a high shutter speed, record in a brighter place than usual.
Choose an appropriate shutter speed according to the place and situation.
See the chart below for examples.

Example use	Recommended shutter speed
• On clear days, recording golf or tennis scenes (To view the hit ball clearly in the pause mode, set to 1/4000) • Recording the skiers	1/4000 or 1/1000
• On overcast days, recording a moving merry-go-round or jet-coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/250
• Instead of the ND2 filter (To reduce the exposure level to approx. 1/2) • Recording indoors (for stable shooting)	1/100

M-3

1 Set the AUTO LOCK switch to the upper position and press the FOCUS button.
2 Press the SHUTTER SPEED button repeatedly until the desired shutter speed indication appears on the viewfinder screen. Each time the SHUTTER SPEED button is pressed, the indication changes:

No indication (1/60) → 4000 (1/4000) → 1000 (1/1000) → 250 (1/250) → 100 (1/100)

Auto focus will not function is this case.
When shooting, use manual focusing.

Shutter Speed Adjustment

Notes

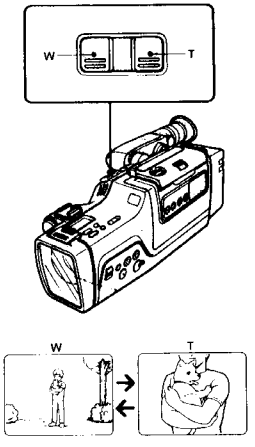
- When shutter speed 1/250 or faster is selected, recording must be done under sunlight or video light.
- When the recording is done under a light discharged tube, such as a fluorescent lamp, sodium lamp, or mercury lamp, the brightness of the recorded picture may vary ("flicker"). If flickers of fluorescent lamps affect the recording in 50 Hz areas, set the shutter speed to 1/100.
- When the shutter speed is changed during a camera recording of a TV screen, the brightness of the recorded picture may vary.
- When a very bright object is shot at a faster shutter speed, a light, vertical, belt-like line ("smear") may appear on the screen.

Zooming

The size of the subject in the scene can be changed.

Power Zoom N

N



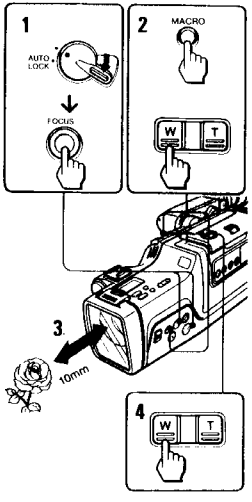
Press the T side of the power zoom button for telephoto and the W side for wide-angle.
The zoom ring will move automatically.

For more zooming effect

- Use an optional conversion lens (VCL-1546A or VCL-0746A).
  Auto focus, however, will not function in that case.
- The focal length of this unit is 9 mm to 54 mm. Converted into the focal length of a 35 mm camera, this means approximately f-48 mm to 288 mm.

Close-ups (Macro) O

O



Even tiny objects can literally fill the screen for dramatic close-up effects.

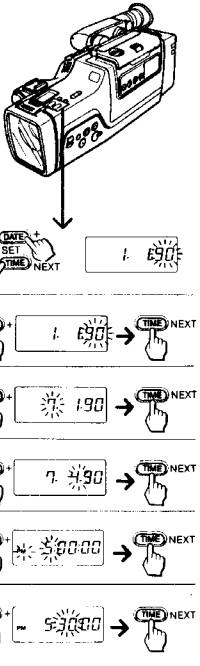
1 Set the AUTO LOCK switch to the upper position and press the FOCUS button.
2 While pressing the MACRO button, press the "W" side of the power zoom button to set the unit to the macro position.
3 Bring the recorder as close as necessary to obtain the desired subject size.
The subject can be as close as approximately 10 mm (13/32 inches) from the lens surface, or from the lens cover surface when the lens cover is attached.
4 Press the power zoom button within the MACRO range to focus sharply.

Notes

- Auto focusing does not function properly in macro shooting.
- If the subject is closer than 10 mm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.
- Zooming is not possible during macro recording. To change the size of the subject, move the camera recorder closer or further away.

Recording Date or Time

P.1



Once the date and the current time are adjusted, the date or time can be recorded together with the picture.

Before setting the date and time, make sure that the battery pack and lithium battery are installed.

To Set Date and Time P.11

1 Press the DATE and TIME SET buttons simultaneously **for more than 3 seconds** until the date indication appears in the display window (date/time setting mode).
The DATE button now functions as the "+" button and the TIME button functions as the NEXT button.
2 Adjust the ● year, ● month, ● day, ● hour and ● minute in sequence, following the illustration.
First adjust the blinking digits with the "+" button, and then press the NEXT button.
After adjusting the minute digits, press the NEXT button at the same time with an announced time signal.

The clock starts operating. There is no need to readjust the date and time as long as the lithium battery remains.

To clear the time indication from the display
Press the TIME SET (NEXT) button again.

The "+" button can be pressed in two ways

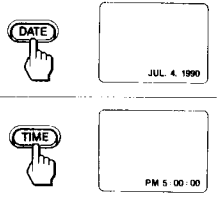
- When you keep the button pressed, the digits will advance continuously.
- When you press and immediately release the button, the digits will advance by one.

Recording Date or Time

To check the preset date and time
Press the DATE or TIME SET button in the recording pause mode. When the same button is pressed again, the indication goes off.

To readjust an incorrect date or time
Set the unit to date/time setting mode and press the NEXT button repeatedly until the incorrect digit blinks. Correct it with the + button and press the NEXT button. After adjusting the minute digits, press the NEXT button at the same time with an anounced time signal.

P.2



To Record the Date or Time P.2

During camera recording or in recording pause mode, press the DATE or TIME SET button to display the date or time on the viewfinder screen.
The date or time being displayed will be recorded together with the picture.

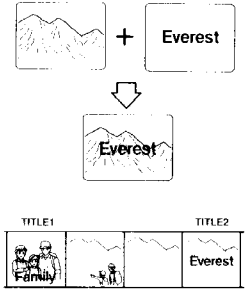
To stop recording the date or time
Press the DATE or TIME SET button again. The picture recording will continue.

Recording a Title

Before recording, memorize a title or figure. The memorized title or figure is superimposed onto the picture being recorded. Q-1

- Two kinds of titles or figures can be memorized.
- The color of the title or figure can be selected from 8 colors.

Q-1



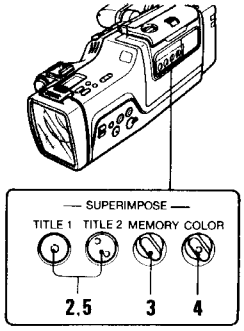
Preparations

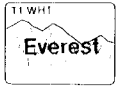
To make a desired title card
Use a white and plane card and draw the title on it with a deep color (black is recommended for the best result) in thick letters.
If contrast is clear, a signboard can be memorized like the title card.

Before memorizing the title
1 Make sure that the lithium battery is installed. See page 38.
2 Set the POWER switch to CAMERA.
3 Set the STANDBY switch to STANDBY. The unit is set to the recording pause mode.

Notes
- When deciding the title size, check the effective picture size on your video monitor.
- To record the title, fix the title card and the video camera recorder.
- To memorize a title, use of an appropriate light is recommended for a better result.
- If the title card is small, use the macro shooting function.

Q-2





To Memorize the Title Q-2

1 Point the camera to the title card and adjust the focus.
2 Press the TITLE 1 or 2 button.
3 Press the MEMORY button to memorize the title.
4 Select the title color while observing the color indication in the viewfinder. Each push on the COLOR button cyclically changes the color, as follows:

WHT → BLUE → GRN → CYAN
(white) (green)
↑ ↓
BLK ← YEL ← VIO ← RED
(black) (yellow) (violet)

5 Press the TITLE 1 or 2 button (pressed in step 2) to turn off the title.

Notes
- The color indication in the viewfinder is not recorded on the tapes.
- You can change the title color even after starting the recording.

To check the title
To check the memorized title, press the TITLE 1 or 2 button. To turn off the title, press the button again.

To Record the Title

To record the title at the beginning
Press the TITLE 1 or 2 button in recording pause mode, and start recording.

To record during camera recording
Press the TITLE 1 or 2 button at the point from which the title is to be inserted.
The memorized title will be recorded together with the picture.

To stop recording the title
Press the TITLE 1 or 2 button again. The picture recording will continue.

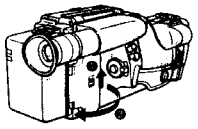
To record the title several times
By pressing the TITLE 1 or 2 button, you can record the title as many times as desired.

Preparation for Playback

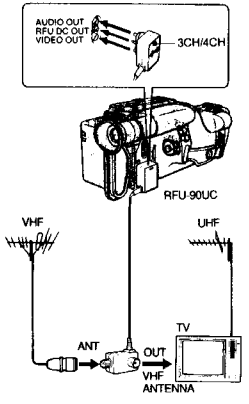
When the VCR is connected to the TV, refer to the pages 92 and 94.

Before connection, open the jack cover. R-1

R-1



R-2



Connecting a TV without audio/video input connectors R-2

1 Connect the RFU adaptor to this unit.
2 Connect the VHF antenna and TV to the antenna selector.
Use a 75-ohm coaxial cable for antenna connection.

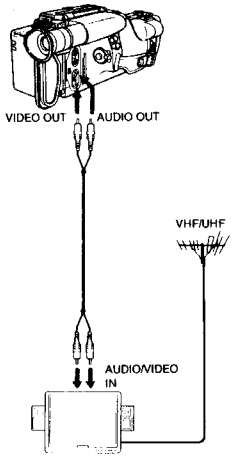
On the TV channel for the video camera recorder
Whenever you view the playback picture, set the channel selector of the RFU adaptor to either VHF channel 3 CH or 4 CH and select the same channel on the TV.

Note on the RFU adaptor
Usually keep the RFU adaptor and the TV connected. When you set the POWER switch of this unit to OFF, the input mode of the TV is automatically switched to TV antenna input.

Preparation for Playback

Connecting a TV (or color monitor) equipped with audio/video input jacks R-3

R-3

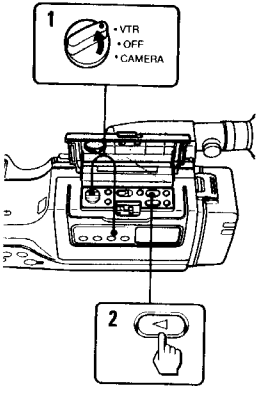


1 Connect this unit to the TV using the supplied AV connecting cord.
2 Set the TV/VIDEO selector button on the TV to VIDEO.

When the TV or color monitor is a stereo type
Use a commercially available audio/video cable (Sony VMC-910MS/920MS or equivalent).

Playback

S-1



Turn on the TV (or color monitor), and select the channel for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

S-1
1 Set the POWER switch to VTR, and insert a cassette.
2 Press the ◁ button.
Playback will start.

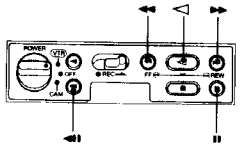
To stop the tape, press the ■ button.

After using, be sure to set the POWER switch to OFF.

To view a still picture
press the ❚❚ button during playback. To resume playback, press the ❚❚ button again.

Monitoring a High-Speed Picture S-2

S-2



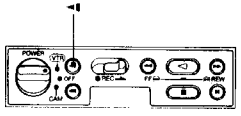
During playback—Picture Search
1 In the playback mode, press the ◀◀ or ▶▶ button.
The picture will be monitored at high speed as long as it is kept pressed.
2 Release the ◀◀ or ▶▶ button at the desired point.
Normal playback will resume.

During fast-forward or rewind—Skip scan
1 Press the ◀◀ button in fast-forward mode or press the ▶▶ button in rewind mode. The picture is displayed while the button is kept pressed.
2 Press the ◁ button to resume normal playback.

To View the Frame-by-Frame Playback Picture S-2

Press the ◀II button in still picture mode. To resume normal playback, press the ◁ button.

S-3



To View the Slow Motion Picture S-3

Press the ◄▮ button during playback or in still picture mode.
To resume normal playback, press the ▮► button.

Notes on various playback modes

- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 5 minutes or more, the unit will automatically enter the stop mode.
- Streaks will appear and the sound will be muted in the high-speed picture.

If the picture is distorted in still, frame-by-frame or slow motion playback mode
Set the unit to slow playback mode, press the "+" or "–" side of the EDITSEARCH button until a clear picture is obtained.
Repeat adjusting until a still picture displayed clearest.

If the still picture appears to shake
Press the "+" or "–" side of the EDITSEARCH button until the picture stabilizes.

Note
The adjustment is retained in memory as long as the lithium battery is installed. Readjustment is only required when the equipment used for playback is changed or when tapes recorded on other equipment are played back on this unit. The noise may not be eliminated completely when a tape recorded on other equipment is played back in still or slow picture mode.

TV Program Recording

The following connections make both TV program viewing/recording and tape playback possible.

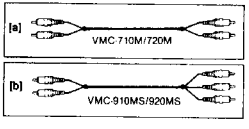
Combination of the Equipment to be Used

Case 1 (page 92)
To connect the VCR without input selector.

Case 2 (page 94)
To connect the VCR with an input selector.

Case 3 (page 96)
To connect the TV tuner and color monitor or TV with audio/video input and output jacks.

T-1



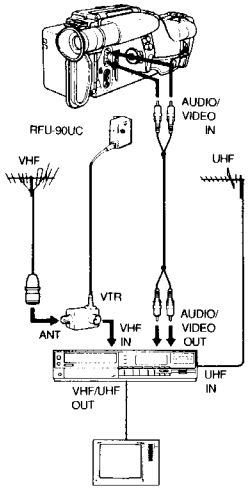
Connecting Cables T-1

- For antenna cable connections, use 75-ohm coaxial cables.
- For video/audio connection, use the supplied or commercially available audio/video cable to match the jacks on the equipment to be connected.

[a] for monaural equipment
phono × 2 ↔ phono × 2
Sony VMC-710M/720M or equivalent

[b] for stereo equipment
phono × 2 ↔ phono × 3
Sony VMC-910MS/920MS or equivalent

T-2



Case 1 : To connect the VCR without input selector

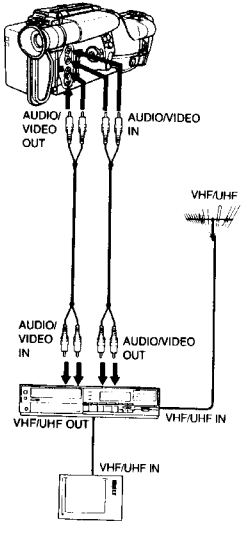
Connections
Connect the equipment as shown in the illustration.

TV program recording T-2
1 Disconnect the RFU adaptor from this unit, if it is connected.
Keep the RFU adaptor and the VCR connected.
2 Turn on the VCR and TV.
3 Set the POWER switch on this unit to VTR.
4 Select the channel for the VCR on the TV.
5 Select the TV channel to be recorded on the VCR.
6 Insert a cassette into this unit and slide the ● REC switch.
Recording will start.

To view another TV program while recording
Set the TV/VTR select button on the VCR to TV and select the desired program on the TV.

Playback
The RFU-90UC RFU adaptor is required.
Connect the RFU adaptor to this unit.
1 Turn on the TV.
2 Set the POWER switch on this unit to VTR.
3 Select the channel for the VCR on the TV.
4 Insert a cassette into this unit and press the ◁ button. Playback will start.

T-3



Case 2 : To connect the VCR with an input selector

Connections
Connect the equipment as shown in the illustration.

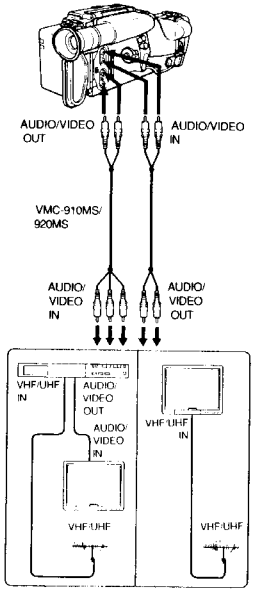
TV program recording T-3
1 Turn on the VCR and TV.
2 Set the POWER switch on this unit to VTR.
3 Select the channel for the VCR on the TV.
4 Set the input selector to TUNER, the TV/VTR select button to VTR and select the TV channel to be recorded on the VCR.
5 Insert a cassette into this unit and slide the ● REC switch.
Recording will start.

To view another TV program while recording
Set the TV/VTR select button on the VCR to TV and select the desired program on the TV.

Playback
1 Turn on the VCR and TV.
2 Set the POWER switch on this unit to VTR.
3 Set the input selector on the VCR to LINE and select the channel for the VCR on the TV.
4 Insert a cassette into this unit and press the ◁ button. Playback will start.

When the VCR to be connected is a stereo type
Use a commercially available audio/video cable (Sony VMC-910MS/920MS or equivalent).

T-4



TV Program Recording

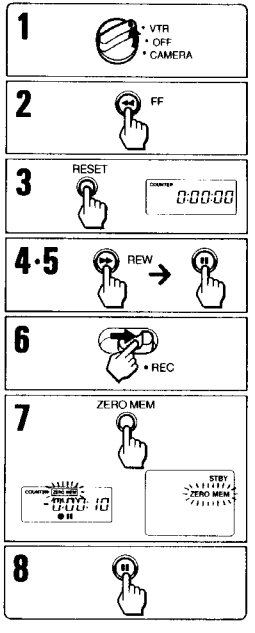
Case 3 : To connect the TV tuner and color monitor, or TV with audio/video input and output jacks

Connections
Connect the equipment as shown in the illustration.

TV program recording T-4
1 Turn on the TV tuner and color monitor, or TV.
2 Set the POWER switch on this unit to VTR.
3 Set the input selector on the TV tuner or TV to TV and select the TV channel to be recorded.
4 Insert a cassette into this unit and slide the ● REC switch.
Recording will start.

Playback
1 Turn on the TV tuner and color monitor, or TV.
2 Set the POWER switch on this unit to VTR.
3 Set the input selector on the TV tuner or TV to VIDEO.
4 Insert a cassette into this unit and press the ◁ button. Playback will start.

U



Insert Recording 2

To Insert a TV Program or a Picture from Another VCR U

Monitor the picture being inserted on the viewfinder screen.

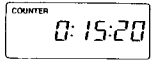
1 Set the POWER switch to VTR.
2 Locate the point on the tape where the insert should end by pressing the ◀◀ button during playback.
3 Display the counter in the display window and press the RESET button.
The counter is reset to zero.
4 Press the ▶▶ button during playback to rewind the tape a little further than the point where the insert should begin.
5 Release the ▶▶ button to resume playback and press the ❚❚ button at the insert starting point.
6 Slide the ● REC switch in the arrow direction to set the unit to recording pause mode.
7 Press the ZERO MEM button.
The insert ending point is stored in memory.
8 To start recording, press the ❚❚ button.

The insert recording will stop automatically near the counter zero point.

To cancel ZERO MEM mode
Press the ZERO MEM button so that the ZERO MEM indicator disappears.

Use of the Tape Counter

[V-1]



During recording or when a tape recorded in the SP mode is played back, the digits on the counter indicate the actual recording or playback time. When a tape recorded in LP mode on another recorder is played back on this unit, the counter counts approximately half the actual playback time.

E.g. When the counter indicates "0:15:20" during playback of an LP-recorded tape, the tape was played back for approximately 30 minutes 40 seconds from the counter zero position. [V-1]

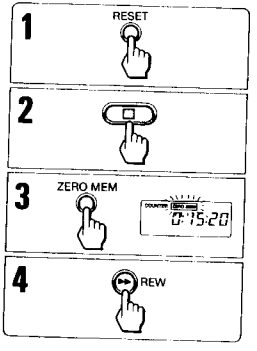
To Index the Whole Tape

Press the RESET button at the beginning of the tape so that the counter shows "0:00:00". By noting the counter reading at a particular point, you can easily find that point later by referring to the tape counter.

Notes

- The counter reading and the point of the tape may not correspond exactly.
- The counter also operates for a blank, unrecorded portion of a tape.
- There will be a time lag of several seconds on the counter reading after repeated fast-forward and rewind operations or after playing back in slow mode for a long time.

[V-2]



Use of the Tape Counter

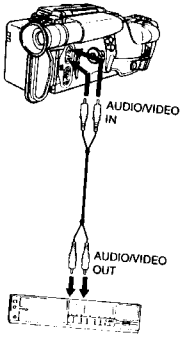
To Return to a Pre-registered Point [V-2]

1. During recording or playback, press the RESET button at the point you later want to locate.
2. Press the ■ button when the recording or playback has finished.
3. Press the ZERO MEM button. The "ZERO MEM" indicator will blink in the display window.
4. Press the ▶▶ or ◀◀ button.
   The tape will be rewound or sent forward and stop automatically when the counter reaches approximately zero.

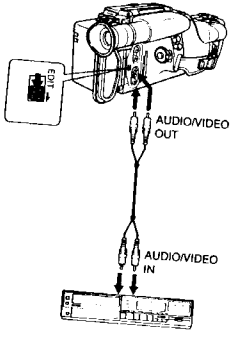
Notes

- The ZERO MEM button does not function during recording or playback mode.
- Be sure to press the ZERO MEM button when the tape is stopped.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to zero.

W-1



W-2



Tape Editing

To edit a home movie tape, you will need another VCR or another video camera recorder. Before connection, open the jack cover.

To Edit from Another VCR to this Unit W-1

1 Set the POWER switch on this unit to VTR.
2 Start playback on another VCR.
3 To start recording, slide the ● REC switch on this unit.

To Edit from this Unit to Another VCR W-2

1 Set the POWER switch on this unit to VTR and turn on the other VCR.
2 Slide the EDIT switch on this unit to EDIT.
3 Set the input selector on the VCR to LINE.
4 Press the ❚❚ button on this unit during playback at the point where you want to start recording.
5 Press the record button on the other VCR, pressing the ❚❚ button.
6 Release the ❚❚ buttons on both units. Recording will start.

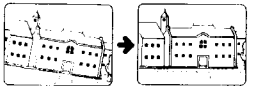
When the VCR to be used is a stereo type, use a commercially available audio/video cable (Sony VMC-910MS/920MS or equivalent).

After editing, turn off both units and be sure to slide the EDIT switch to the upper position.

To cut off an unnecessary portion
Press the ❚❚ button on this unit at the beginning of the unnecessary portion.
Release it where you want to resume recording.

Function of the EDIT switch
Slide this switch down whenever you edit tapes.
Signal loss that results from tape-to-tape transfer will be reduced, achieving more accurate signal transfer.
When recording or playing back normally, keep this switch in the upper position.

X-2



Others

Hints for Better Shooting

Getting Stable Pictures

Take a good posture for shooting X-1
For hand-held shots, it is important to hold the recorder properly.
- Hold the recorder firmly and secure it with the grip belt so that you can easily manipulate the recorder with your thumb.
- Place your right elbow firmly against your side.
- Place your left hand under the recorder to support it. When adjusting the focus manually, make sure the recorder does not move.
- Stand opposite to the subject and let your feet take a comfortable stance.
- Place your eye firmly against the viewfinder eyecup.
- Breathe gently.

Use a tripod
If you have a tripod for a still camera, it can also be used with the recorder. If a tripod is not available, try placing the recorder on a tabletop or any other flat surface of suitable height.

Keep the horizontal place level X-2
The horizontal place can be easily determined by using the viewfinder frame as a reference.

Planning Ahead

If you are going to edit the tape after recording
Shoot the scene a little longer to make the editing easier.

If you are not going to edit the tape after recording
First record a title and then use the START/STOP button to make a smooth recording.

Hints for better Shooting

Lighting

Shoot with the sun behind you
When the light source is behind the subject, or in the following situations, the subject will be recorded too dark and the background too light.
- The subject is indoors and there is a window behind the subject.
- Bright sources such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background. In this case, the face will be recorded too dark.

Use video lights in the dark
To get the best colors, a sufficient light level must be maintained.
Photography lamps or halogen lamps are recommended. For best results, use of Sony video lights is recommended since their weight and low heat output levels allow safe, direct connection to the recorder.
Do not point the light at the recorder. The high heat from the light can warp the casing of the recorder.
For detailed instructions on proper use of the light, read its instruction manual.

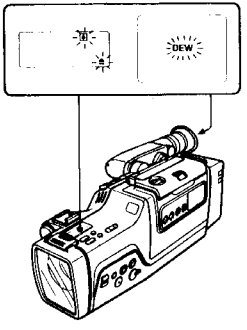
Hints for better Shooting

Brightness levels
Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording technique.

	unit: lux	ND filter recommended
Snow-covered mountains Snow fields		
Sandy beach, clear day in summer		
Clear day, mid-day (100,000) Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)	100,000	
	10,000	
Overcast day, one hour after sunrise (2,000) Office lit by fluorescent lamps, near window (1,000)	1,000	Normal recording
Clear day, one hour before sunset (1,000) Department store counter (500 - 700) Station wicket (650)	500	
Office lit by fluorescent lamps (400 - 500) Room lit by two 30 W fluorescent lamps (300) Subway station platform (300)	300	
Arcade at night (150 - 200)	100	Video light recommended
Theater lobby (15 - 35) Candlelight (10 - 15)		
	10	

Note
When an ND filter is attached, the lens cover cannot be attached. Therefore, when using the unit with the lens cover attached in bright places such as a ski mountain, set the shutter speed around 1/250.

Y-1



Y-2

Notes on Moisture Condensation

If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit, on the surface of the tape or on the lens. In this condition, the tape may adhere to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the unit is furnished with moisture sensors.

If moisture condenses inside the unit Y-1

Moisture is present inside the recorder when the DEW indicator blinks in the viewfinder and the [⬇] and ⏏ indicators blink in the display window. In such cases, no function except for tape ejection will work.
Eject the tape, turn off the recorder, and leave it with the cassette holder open for at least 1 hour.
The recorder can be used again if the none of the DEW, [⬇] and ⏏ indicators does not appear when the power is turned on again.

If moisture condenses on the surface of the tape Y-2

If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (►□), ◄◄, etc.) is pressed, the ⏏ indicator blinks in the display window. In such a case, no function except for tape ejection will work.
Eject the tape and let the recorder and the tape sit for at least 1 hour.
the tape can be used again if the ⏏ indicator does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens

No caution indicators will appear, but the picture becomes dim.
Turn off the power and leave the recorder unused for at least 1 hour.

Z

Video Head Cleaning

To ensure clear picture, clean the video heads periodically [Z]
When playback pictures are noisy or hardly visible, the video heads may be contaminated.
[a] shows slight contamination.
[b] shows critical contamination.
In such cases:
1 Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied) referring to its instructions.
2 After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.
3 If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)

If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Precautions

On operation

- Operate the unit on 6.0V (battery pack) or 7.5V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.

Do not hold the unit by the viewfinder.
Avoid rough handling or mechanical shock to the unit. Be particularly careful of the lens.
Do not apply excessive force to the microphone.
Avoid shooting the same object for a long period of time (for example, using as a lookout camera or pointing the camera directly at the sun or other bright light sources) as this will damage the color filter inside the camera and may cause a poor picture quality.
Remove and store video cassettes after recording or playback.
Do not wrap up the unit and operate it because heat may build up internally.
Avoid using and storing the recorder in the following locations.

- Locations susceptible to vibration.
- Locations exposed to strong magnetic fields.
- Locations near TV or radio transmitters where strong radio waves are generated.

Do not put the unit on the sand.

Care

Store cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.
When the unit will not be used for a long period of time, periodically turn on the power, operate the camera section and recorder section and play back a tape for about three minutes.

Using Your Recorder Abroad

Each country has special TV color broadcast and electricity systems. Before using your recorder abroad, check the following points.

Power Sources

You can use your recorder in any country with the supplied AC power adaptor within 110 V – 240 V AC, 50/60 Hz.

Differences in Color System

You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be an NTSC-system based TV and should have video/audio inputs.

NTSC system countries
Bahama Islands, Canada, Central America, Japan, Korea, Mexico, Taiwan, the Philippines, U.S.A., etc.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, West Germany, etc.

SECAM system countries
Bulgaria, France, Hungary, Iran, Iraq, Monaco, Poland, the Soviet Union, etc.

Specifications

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 1.43 cm/sec. LP: Approx. 0.72 cm/sec. (playback only)
Recording time	SP mode: 2 hours (P6-120)
Playback time	SP mode: 2 hours LP mode: 4 hours (P6-120)
Fast forward time	Approx. 6 min. 30 sec. (P6-120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 6 × power zoom lens f = 9 — 54 mm, F1.4 with macro Filter diameter: 46 mm
Auto focus system	Infrared autofocus
Color temperature	Auto: From the light at a tungsten lamp to the light on a slightly overcast day.
Minimum illumination	3 lux
Illumination range	3 lux – 100,000 lux (0.3 – 9,294 footcandles)
Recommended illumination	More than 100 lux (9.3 footcandles)
Aperture correction	Automatic

Input and output connector

Video output	Phono jack, 1 Vp-p, 75 ohms unbalanced, sync negative
Audio output	Phono jack, – 7.5dBs, at load impedance 47 kilohms Impedance less than 2.2 kilohms
RFU DC OUT	Special minijack, 5 V DC
Video input	Phono jack, 1Vp-p, 75 ohms unbalanced, sync negative
Audio input	Phono jack, – 7.5dBs, input impedance more than 47 kilohms
Earphone jack	Minijack, 8-ohm impedance
Remote jack	Stereo mini-minijack
MIC jack	Minijack, – 86dBs, low impedance With 2.5 — 3 V DC output, impedance 6.8 kilohms
Microphone power output jack	Special minijack, 5 V DC

General

Power requirements	On battery mounting surface 6.0 V (battery pack) 7.5 V (AC power adaptor)
Power consumption	6.5 W (camera recording) including the viewfinder
Installation	Vertically
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	– 20°C to + 60°C (– 4°F to + 140°F)
Dimensions	Approx. 136 × 137 × 347 mm (w/h/d) (5 3/8 × 5 1/2 × 13 3/4 in.)
Weight	Approx. 1.7 kg (3 lb 12 oz) excluding the battery and cassette
Microphone	Electret condenser microphone, omni-directional monaural type
Supplied accessories	See page 3.

Design and specifications are subject to change without notice.